



**I-95 CORRIDOR
COALITION**

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**I-95 Corridor Coalition
Evaluation of the
Advanced Traveler Information System
Field Operational Test
(TravTIPS)**

Submitted to:

**Joint Program Office, Federal Highway Administration
I-95 Corridor Coalition**

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Executive Summary

Project Background

The transportation agencies along the I-95 corridor have historically collected static and real-time transportation and travel information focused primarily on their own states or regional state groupings. Access to this information on a corridor-wide basis has been limited, and was often not readily available for sharing between states.

To address this problem, the I-95 Corridor Coalition (I-95 CC) funded a Field Operations Tests (FOT) to develop a corridor wide advanced traveler information system (ATIS). The FOT was developed to provide hands-on deployment experience to address the following four issues:

- Sustainability: Does a regional ATIS model support a sustainable business? What factors affect the sustainability?
- Public-Private Partnership: What are the institutional issues and challenges associated with deployment of a regional ATIS?
- ATIS Business Environment: What are the technical and business issues associated with the deployment of a regional ATIS?
- Effects of this FOT: Can this program increase the involvement and awareness of ATIS among other private sector firms?

The service delivery method selected by the I-95 Corridor ATIS for the ATIS FOT was a public-private partnership. ARINC, Inc., located in Annapolis, Maryland, was selected through a Request for Proposals process to provide ATIS services through the Travel and Transportation Information and Personalized Service project (TravTIPS). The I-95 CC provided seed money to help fund development, with the expectation that TravTIPS eventually would become self-sustaining. The partnership was structured as follows:

- The public partners, Massachusetts Bay Transportation Authority (MBTA), Massachusetts Turnpike Authority (MTA), and Connecticut Department of Transportation (ConnDOT), agreed to provide ARINC with traffic data from their respective traffic operations centers.
- ARINC, in turn, would fuse and expand these data to develop multi-modal travel information to support interagency and interregional traffic and incident management, and would provide this data to the public partners.
- The fused data would be accessible to the general public through TravTIPS using a public-private communication and a switching and information network.
- The TravTIPS network and workstation software would provide whiteboard and email capabilities to enable the participating agencies and the I-95 CC to test interregional traffic operations centers.
- ARINC would develop value-added, customized information and services and provide these for a fee to recoup investment costs and develop a self-sustaining ATIS service. Cost also would be recovered through Internet advertising.

Implementation Results

ARINC designed TravTIPS to offer integrated traveler information via the web, kiosks, and wireless applications and customized corporate services. However, only the web portion has been deployed, and it has been poorly advertised. ARINC negotiated with the I-95 CC to terminate their contract; this was done in the summer of 2000. As a corporation, ARINC has decided that an integrated ATIS service is not an economically viable product. In a report prepared by Andersen Consulting the company was told that they would need to invest over \$40 million in branding alone to make the product profitable, and even then a return on investment could not be made within 5 years.

A number of factors contributed to TravTIPS lack of success as a production-level system, including:

- Growth of the Internet. At the time ARINC was developing TravTIPS, many corporations developed Internet applications, offering these services at no fee. The market for the integrated, fee-based service ARINC was offering did not develop, as consumers opted for services available free of charge, even though these services were not integrated.
- Institutional issues. The project was supported strongly by the I-95 CC, but no “champion” was appointed to oversee the implementation. The project was managed through Corridor Coalition program track committees; consequently, the decision-making process was time-consuming. A process for quickly resolving issues was not successfully developed, and as a result, ARINC’s ability to respond to changes in project scope based on market conditions was not sufficient to ensure project success. The public-private partnership model used for TravTIPS was new to many state agencies. This led to “mission conflict” between service-oriented government agencies and the profit-oriented ARINC. Adjustments necessary to adapt to this new approach slowed the decision-making process.

Conclusions

The TravTIPS business model was unique in that it proposed to deploy a regional ATIS that would provide information about multiple transportation modes. TravTIPS, as proposed, would provide trip information and enable customers to use this information to make travel-related decisions. TravTIPS proposed the distribution of this information over multiple channels. What made the TravTIPS proposal unique was that it offered the prospect of becoming a sustainable business. Also, it offered multiple levels of services. Although ARINC has made a business decision to not deploy TravTIPS, the FOT has provided a wealth of valuable lessons that will be beneficial to future ATIS and other intelligent transportation system (ITS) deployments and to future public-private partnerships. The evaluation team drew the following conclusions from the TravTIPS implementation experience:

Conclusion #1: Public-private partnerships must be developed with the flexibility necessary for private partners to generate a return on investment. In addition, the roles

and responsibilities of all partners must be clearly defined prior to project implementation and a public sector champion must be identified and empowered.

Conclusion #2: The business plan should be flexible enough to enable private partners to respond to changes in market conditions. The business plan also should include market research.

Conclusion #3: Procurement processes must be structured so that private vendors can respond to changes in market conditions. The scope of work governing a public-private partnership needs to be viewed as a flexible document rather than a statement of fixed deliverables.

Conclusion #4: Data sharing agreements and data standards need to be actively established.

Conclusion #5: There does not appear to be a viable market for integrated, regional ATIS services available for a fee. In addition, Internet-based advertising revenues are not as strong as anticipated at the beginning of the FOT.

Conclusion #6: Any ATIS fee-based service must have developed a market niche with a service that is unique from other, non-fee based services, or must have national recognition (a “brand name”) to attract and keep customers.

1.0 Introduction

1.1 I-95 Corridor Coalition Overview

The I-95 corridor is one of the most heavily traveled sections of the interstate highway system in the North America. The Northeast segment, stretching from Maine through Virginia, is also one of the most highly urbanized areas in the country and experiences significant congestion, safety problems, and other travel-related inefficiencies.

Although many of the transportation agencies from the states along the corridor recognized the need to work together to address traffic safety and congestion issues, the states did not have a forum to develop and implement multi-state and regional solutions. Such a forum was established through the landmark ISTEA legislation, which appropriated funding to establish the I-95 CC, a consortium of agencies and other stakeholders representing Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, and the District of Columbia.

The I-95 CC is a “virtual organization” whose members include representatives from Departments of Motor Vehicles and Transportation, Toll Authorities, State Police, Tax and Revenue agencies and Public Service Commissions from the mid-Atlantic and northeastern states. In addition to these state agencies, a number of industry and trade associations are also members of the I-95 CC, including the American Trucking Association, the National Private Truck Council, the American Association of Motor Vehicle Administrators, and the Intelligent Transportation Society of America. The U.S. Department of Transportation serves in the dual capacity as a primary sponsor of the coalition and an active member. The I-95 CC is committed to identifying and deploying intelligent transportation systems (ITS) to help enhance highway safety, improve mobility and freight movement, and reduce congestion along the I-95 corridor, as reflected in its mission statement:

“We are working together to implement improved transportation efficiency and services in the Northeast Corridor and to create a seamless, multi-modal, state-of-the-art transportation system.”

The Corridor Coalition is organized into six program tracks to address specific issues, such as commercial vehicle operations, highway operations and incident management, and traveler information. An Executive Committee, comprising senior management from member agencies, provides high-level program and policy direction for the I-95 CC. A Steering Committee oversees operations and the development of program and project plans and coordinates activities among the program tracks, each of which is represented on a Program Management Committee. Each program track develops an annual work plan, with the Executive Committee granting final approval to a comprehensive Corridor Coalition annual work plan. Funding for the Corridor Coalition’s work plans comes from funding provided in both ISTEA and TEA-21.

1.2 I-95 Corridor Coalition ATIS Program

Previously, the transportation agencies along the I-95 corridor collected static and real-time transportation and travel information focused primarily on their own states or regional state groupings. Access to this information on a corridor-wide basis was limited, and often was not readily available for sharing between states.

To address this problem, one of the early FOTs funded by the I-95 Corridor Coalition (CC) was the development of a corridor-wide ATIS. An ATIS Program Track established to oversee I-95 CC traveler information program was assigned oversight responsibility for the FOT, and the Boston to New York travel corridor was selected as the site to implement the ATIS FOT with the goal to provide timely and accurate traffic and travel information along the corridor. The FOT was designed as a 3-year project, with the first year focusing on initial deployment of traveler information services, followed by 2 years of operations. A principal objective of the FOT was to test the viability of a self-sustaining traveler information services business that would continue after completion of the FOT.

The I-95 CC ATIS program was designed to provide benefits to both public and private sectors. Users were to be provided with static and dynamic information for all major modes of transportation available along the corridor. The public agencies participating in the FOT (Massachusetts Highway Department (MHD), MTA, MBTA, and ConnDOT) were to be able to receive multi-modal, travel information to support interagency and interregional traffic and incident management from a private sector service provider. This information obtained in exchange for service provider access to each agency's traffic data (incident data; volume, speed, and occupancy information; construction and maintenance activities; and, transit schedule, fare, and stop information). The network and workstation software developed to support this exchange were intended to provide whiteboard and mail capability to support interagency coordination.

The ATIS program was designed to provide at least the following three primary services for the Region:

- Multi-mode travel information on a World Wide Web page disseminated via the Internet, scheduled for beta-test in January, 1999;
- Multi-mode travel information and trip planning services planned for early 1999 with limited personalization that was fee-related and disseminated via kiosks in South Station (Boston) and Penn Station (New York); and
- Multi-mode travel information and trip planning services planned for 1999 with full personalization disseminated via the Internet to at least one corporate customer.

Private sources, such as ETAK, METRO Networks, AMTRAK, and ARINC were expected to provide multi-modal traveler information through links with other modes of transportation (e.g. rail and air) as well as congestion and incident data where available. The services were to be available through any commercially available web browser and

an Internet connection. Added services were to be provided in the future based on their economic viability to the public and private partners.

1.3 Service Delivery: Public-Private Partnership

The service delivery system selected by the I-95 Corridor Coalition for the ATIS FOT was a Public-Private Partnership. ARINC, Inc., located in Annapolis, MD, was selected through a Request for Proposals process to be the provider of ATIS services through its Travel and Transportation Information and Personalized Service (TravTIPS).

Total funding for the project was estimated at \$4.5 million. Of this, \$ 1 million was to be provided by the Corridor Coalition and member agencies, primarily through in-kind contributions. ARINC in turn anticipated raising \$2.5 million in private sector funds to help fund the development and deployment of TravTIPS as a self-sustaining traveler information business operation. ARINC committed to investing funds to upgrade its information and network facilities located in Annapolis and to monitor services provided through TravTIPS on a 24-hour, seven day a week basis. This upgrade was to include the provision of the processor, firewalls, and server components needed to implement the web-based applications and services that would support TravTIPS.

1.4 Service Descriptions

Through the ATIS program, ARINC agreed to disseminate information using a number of media and delivery mechanisms, including:

- **Internet.** ARINC agreed to provide single-access service for multi-mode local and regional travel information for the Boston and New York areas and major highways between the two cities. A web page was to present near-real-time assessments of traveler conditions using color-coded maps. Transit schedules and fares, rail schedules and fares, and flight status and gate assignments were to be available via the Internet. Dynamic traffic predictions were to be added as a service enhancement during the second software build.
- **Kiosks.** Kiosk stations, with two kiosks per station, were to be installed at South Station (Boston) and at Penn Station (New York City). These kiosk stations were to provide single access to multi-mode traveler information including metro, regional, and interregional traffic, transit routes, station locations and schedules, flight information, and rail specific to the New York and Boston metropolitan areas. The kiosks were also to provide, for a fee, access to the Internet for key traveler information beyond the project's basic web page.
- **Intranet/ Corporate Services.** A personalized traveler information service (for a fee) to corporate customers via an Intranet was to be provided. Personalized features were to include specific mode information inquiries, traveler preference files, and exception messaging. All aspects of the Internet web page were to be available to the corporate user. A specific corporate partner was to participate in this service.

- **Integrated Transportation Collaborative Decision Making Service.** This service was intended to support intra- and interregional traffic management to provide for interagency and interregional collaboration between the MHD Travel Operations Center, the MTA Integrated Project Control System, and ConnDOT TOC. The service was to support field-testing a virtual traffic information control center (TICC) concept.

2.0 TravTIPS Project Description

2.1 Business Model and Concept of Operations

TravTIPS was designed to provide users with static and dynamic information for all modes of transportation. ARINC's expectation was that corporate and public users would utilize TravTIPS as a decision support system for pre-trip planning. Users would be able to check TravTIPS for weather conditions; schedules, delays, and cancellations for all modes of transportation; road conditions; and incidents to make trip decisions. For travelers in the midst of a multi-segment trip, TravTIPS data would provide information on the next segment. TravTIPS would also allow users to check options for alternative transport, rescheduling, or rerouting.

ARINC anticipated expanding this initial TravTIPS information and service by providing value-added services that end users could access for a fee. ARINC also anticipated that advertising receipts would provide a significant revenue stream. For-fee services that ARINC anticipated building into TravTIPS included:

- Internet and e-mail access
- Hotel services
- Corporate ATIS packages
- Wireless: Digital DJ using DARC; SEIKO using HSDS
- Links to product manufacturers
- Expanded interfaces to other travel information services such as NY MDI MTIS and Boston Traffic Department.

ARINC planned to use information technology such as web browsers, GIS software, and frame relay communication, to enhance the delivery of information and services to end users, with the expectation that the TravTIPS infrastructure would enable ATIS services to grow and expand. The expectation was that by seeding the ATIS market with expanded access to information and services, additional private sector partners would be willing to invest in TravTIPS. ARINC planned on implementing a "use case" based approach to identify and develop these additional services.

2.2 Architecture

The TravTIPS architecture was to be comprised of the following subsystems:

- **Data Collection.** This subsystem was to consist of the software needed at the central facility to translate information from public and private data sources and the Information Service Providers (ISPs), into the internal TravTIPS database format. It included the network equipment that was to be installed at the ISP site(s).
- **Central Processing and Storage.** This subsystem was to consist of the web servers, firewalls, routers, and frame relay equipment needed to host TravTIPS applications. In the future, dedicated back-end machines would be provided to host special purpose processing such as traffic flow prediction.

- **Network.** The network would consist of leased T-1 circuits and frame relay services provided by the common carrier.
- **Customer Services.** This subsystem was planned to consist of the following equipment, at a minimum, for each of the services:
 - Corporate Services. This equipment was to consist of the routers located at the customer sites to provide an interface to the TravTIPS intranet.
 - Public Agency Services. This equipment was to consist of the communications equipment needed to provide an interface to the TravTIPS intranet.
 - Kiosks. This equipment was to consist of a dual terminal configuration that would be capable of accepting a credit or debit card for payment of services, such as Internet access, over and above those provided by TravTIPS.
 - Wireless Services. This equipment was to consist of the software required to generate a data feed to the FM subcarrier system and the FM subcarrier modulator devices.

A conceptual view of the TravTIPS communication system architecture for the I-95 CC ATIS is shown in Figure 2.1. The logical architecture is displayed in Figure 2.2. In summary, as presented in the proposed architecture, multi-modal traveler information would be received from public and private sources into the central processing system. The data were to be fused, stored, and made available on various ATIS servers and the intranet for dissemination to the public agency partners, ISP services (via Internet), and other free services available as part of the initial traveler information services.

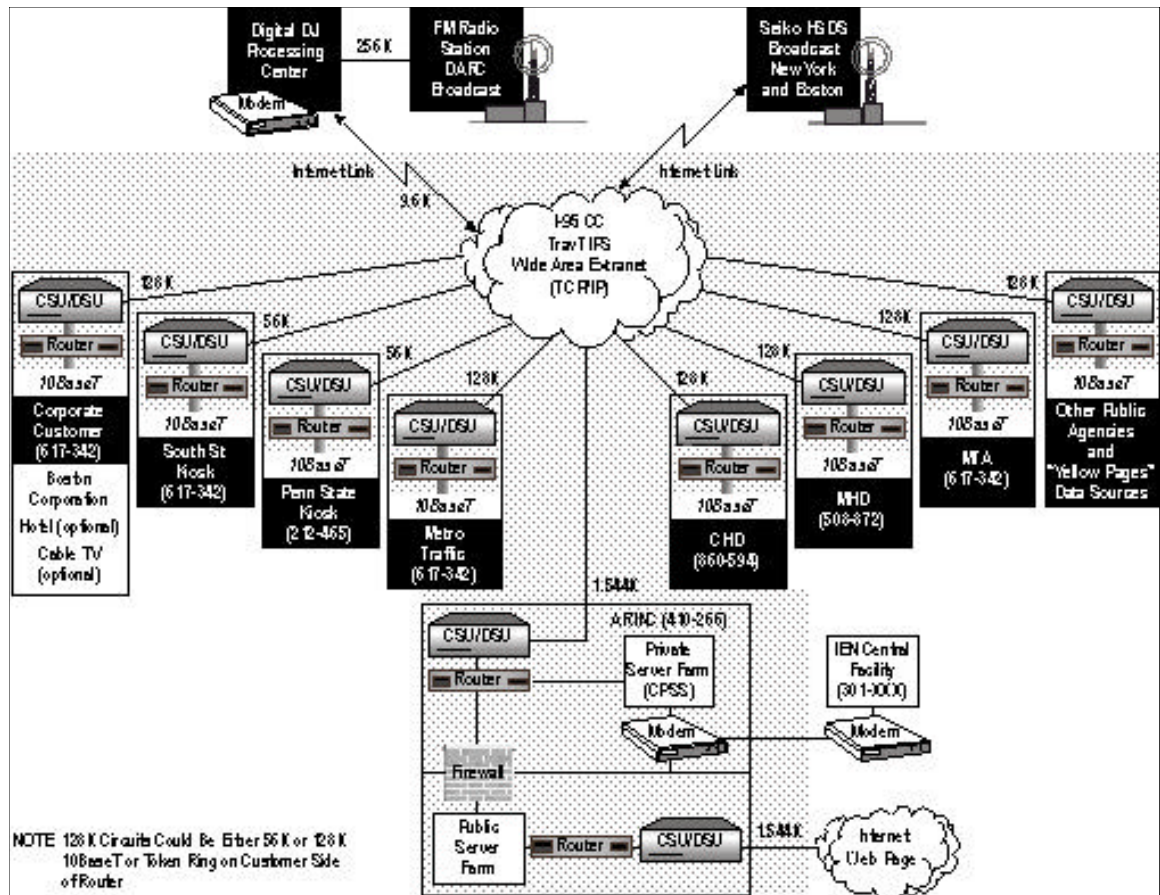


Figure 2.1 TravTIPS Communication System Architecture

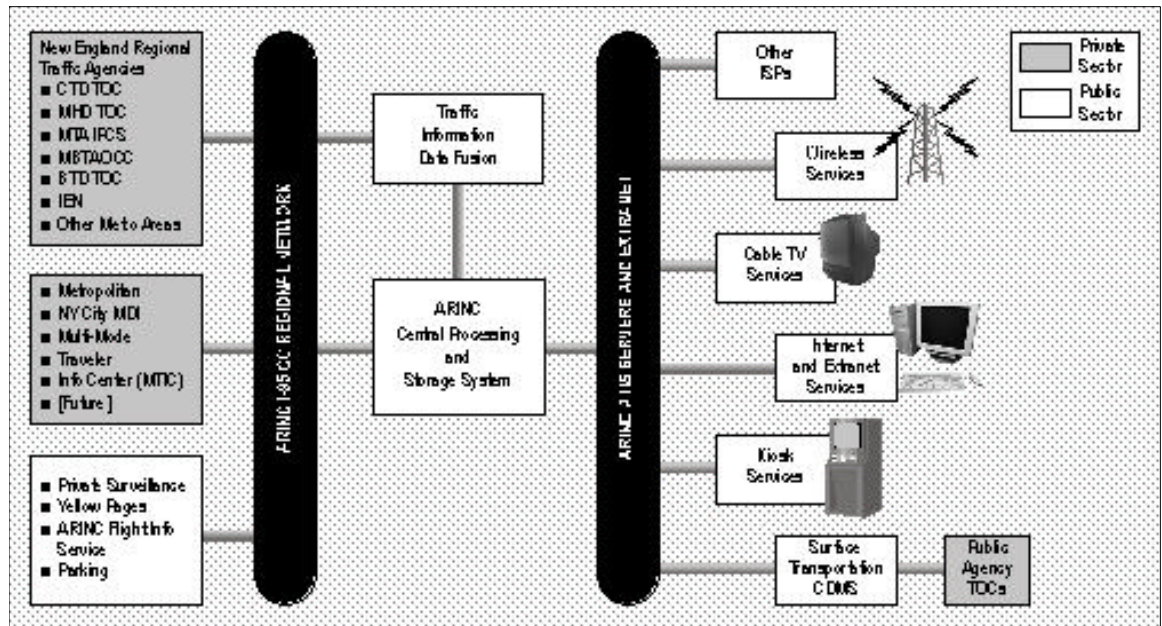


Figure 2.2 TravTIPS Logical Architecture

2.3 Data Sources and Types

The initial data sources and data types proposed for TravTIPS are summarized in Table 2.1. ARINC intended to evaluate the incremental cost and potential benefit of adding other data sources throughout the course of the project.

Table 2.1 Initial Data Sources and Types

Data Source	Data Type
MHD Traffic Operations Center	Incidents, road surface conditions for I-95, I-495, I-93, and Rt 2 Loop data for I-95 and I-93 Construction and maintenance
MTA-Integrated Project Control System	Incident data for Mass Turnpike, Ted Williams, Calahan, and Summer Tunnels, Central Artery Congestion and maintenance
MBTA	Transit schedules and fares Transit stop locations
AMTRAK	Commuter and high-speed rail schedules and fares
ConnDOT	Incidents Congestion
METRO Networks	Incidents Congestion on NY and Boston highways and arterials
ARINC	Internet-based direct-to-airline travel deals Airline ticketing

3.0 Evaluation Methodology and Data Collection Techniques

3.1 Proposed Evaluation Goals and Objectives

The proposed goals and objectives for the evaluation were developed during a series of meetings between the I-95 CC's ATIS Committee and the SAIC evaluation team. These goals and objectives were developed to mirror the goals and objectives established for the ATIS field operational test by the I-95 CC ATIS Committee to ensure consistency between the FOT and the evaluation. The goals and objectives initially developed for the evaluation are as follows:

Goal #1: To Define the Marketability and Sustainability of the ATIS Program on a Regional Basis.

Objectives:

- To identify the marketability and sustainability of the ATIS program overall and by device type, user, and free vs. fee-based service.
- To define the benefits of the ATIS program to the ATIS industry/transportation community.
- To define the benefits of the ATIS program to the users.
- To define the perceived benefits of the ATIS program to the participating agencies.
- To improve transportation service by the participating agencies using the information from the service.
- To improve customer satisfaction by the participating agencies in the processes of providing to and obtaining information from the services.
- To document or estimate the relevant costs associated with the ATIS program.

Goal #2: To enhance the understanding of the process to develop and maintain public-private partnerships.

Objectives:

- To document the steps and processes, institutional issues, successes and failures, and a model for public-private and private-private partnerships during the development of the ATIS program.
- To refine the public-private partnership model.

Goal #3: To utilize the traveler information to make informed travel decisions.

Objectives:

- To guide travelers to more efficient modes of travel.
- To guide travelers to more efficient travel paths between origin and destination.
- To guide travelers to more efficient time periods to conduct specific trips.
- To increase flexibility in travel options by travelers.

- To define and enhance the value/worth of the traveler information by users, device type/source, and free vs. fee-based services.

Goal #4: To provide useful traffic and travel-related information to interregional travelers and other users within the study area.

Objectives:

- To provide reliable, timely, comprehensive, user-friendly multi-modal traveler information to users (by type of device and free vs. fee-based service).

3.2 Proposed Evaluation Strategy

The preliminary strategy, organized by evaluation goal and objective, was submitted to the Federal Highway Administration in the spring of 1999. This strategy was developed during the course of several meetings and discussions among the I-95 ATIS Committee and SAIC evaluation team members. For each of the goals and objectives, test hypotheses were identified. These hypotheses are associated with specific criteria to be evaluated in assessing the effectiveness of the program in meeting the established goals and objectives and aid in describing how specific evaluation measures or measures of effectiveness (MOE) are defined. These measures were investigated to test the hypotheses.

3.3 Proposed Data Collection Techniques

The studies were proposed for conduct at several stages in the evaluation program to evaluate the specific programs under several levels of maturity and development (e.g. beta form of WWW page was implemented in January 1999 while the kiosk program was proposed for early 1999). The initial evaluation plan proposed a number of data collection techniques, including:

- Case Study – review of business plan, business plan updates, documentation of project activities with the intent of identifying “lessons learned”, that is, what succeeded/failed and why, what should be repeated/avoided in future projects, and similar information.
- Cost Review – review of project cost and revenue data, including, if feasible, a cash-flow analysis.
- Market Data – review of marketing studies, user surveys, market penetration indicators to determine if TravTIPS was able to identify and develop a market capable of sustaining the service.
- System Performance Logs – maintained by ARINC on all aspects of system performance, including reliability, accuracy of data, response time, and similar information.
- Surveys of Users and/or Participating Agencies to determine what they liked/disliked about the service, what worked well/did not work well, changes they would like to see, problems encountered, and similar issues.

- Focus Groups on the use and performance of the system. These would draw upon the surveys, and would be used to obtain direct user feedback on the system.

These data collection techniques, and the associated test plans, proposed for the evaluation assumed the actual implementation of TravTIPS. The goals, objectives, test hypotheses, measures of effectiveness, and data requirements developed for the original evaluation strategy are presented in Table 3.1.

3.4 Revised Data Collection Techniques

The decisions by ARINC not to deploy TravTIPS and the I-95 CC to terminate the project required that the evaluation effort be modified accordingly. The data collection techniques that were actually utilized for the evaluation effort included:

- Stakeholder interviews with representatives from I-95 CC member agencies and ARINC.
- Review of project documentation – performance logs maintained by ARINC for the TravTIPS web site deployment, related correspondence, marketing/business plans, project reports.
- Attendance at and documentation of project related meetings and workshops.

Because of the decision not to deploy TravTIPS, quantitative data was not readily available to support the evaluation. Instead, the data collected and analyzed was qualitative in nature. The emphasis of the analysis was to document lessons learned that could be of benefit to similar public-private partnerships and projects.

Table 3.1. Preliminary Evaluation Strategy and Hypotheses

Goal #1: To define the marketability and sustainability of the ATIS program on a regional basis.

<u>Objective</u>	<u>Hypothesis</u>	<u>MOE</u>	<u>Data Source/ Req.</u>	<u>Analysis</u>
.To identify the marketability and sustainability of the ATIS program.	.The ATIS services will generate sufficient user interest to make their continued use viable and sustainable.	.Level of market penetration by product/program .User perception on program benefits .Market growth over time	.Market data by system developers .System cost data .User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Analysis of marketability measures of program .Documentation and statistical comparison of survey/interview findings
	.The revenues collected from the fees and other sources will be sufficient to cover operations costs.	.Revenue estimates for TIS programs .System Operations cost estimates .Level of market penetration by TIS product	.Market data by system developers .Cost data and revenue estimates from system developers	.Analysis of rate of return and cost-effectiveness measures of program
.To define the benefits of the ATIS program to the ATIS industry/transportation community.	.The regional ATIS and its development will provide added benefits to ATIS programs and their development.	.Value-added service (e.g. standardization of data formats, etc.) developed by program .Key findings/issues/products/services with program development .Industry/transportation community perception on program benefits	.Market data by system developers .System documentation by system developers .Interviews with officials in transportation community and industry	.Documentation of benefits and value-added services .Documentation of case study on industry benefits

Table 3.1. Preliminary Evaluation Strategy and Hypotheses

Goal #1: To define the marketability and sustainability of the ATIS program on a regional basis (contd.).

<u>Objective</u>	<u>Hypothesis</u>	<u>MOE</u>	<u>Data Source/ Req.</u>	<u>Analysis</u>
.To define the perceived benefits of ATIS to its users.	.Users will find the ATIS program and services to be a valuable aid for their travel planning purposes.	.Perceived travel time savings .User perception on program benefits .User willingness-to-pay for TIS products	.User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Documentation and statistical comparison of survey/interview findings
.To define the perceived benefits of the ATIS program and services to the participating agencies.	.Agencies will find the ATIS program and services to be valuable for their purposes.	.Agency perception on program benefits	.Agency interviews/survey of key staff from participating agencies	.Documentation and statistical comparison of survey/interview findings
.To improve transportation service by the participating agencies using information from the TIS	.The TIS information supplied to participating agencies will improve transportation service for the agency & highway community.	.Users and agencies' perception on impact of TIS-provided info. on transportation service	.Agency interviews/survey of key staff from participating agencies	.Documentation and statistical comparison of survey/interview findings
.To provide & maintain functional processes in providing to and obtaining information from the TIS by participating agencies.	.The information & procedures in providing TIS information to & from the participating agencies meets the expect.of agencies	.Agencies' perception on efficiency/effectiveness of procedures	.Agency interviews/survey of key staff from participating agencies .Performance logs	.Documentation and statistical comparison of survey/interview findings
.To document or estimate the relevant costs associated with the specific TIS programs.	.The costs of the TIS program(s) and elements will be useful information to other parties.	.System development and operation costs by element of the program(s)	.Cost (development, O & M, and pre-existing/pre-developed) data from system developer and I-95 CC .Research on other programs nationwide	.Definition of program costs by service & service level

Table 3.1. Preliminary Evaluation Strategy and Hypotheses

Goal #2: To enhance the understanding of the process to develop and maintain public-private partnerships.

<u>Objective</u>	<u>Hypothesis</u>	<u>MOE</u>	<u>Data Source/ Req.</u>	<u>Analysis</u>
.To document the steps and processes, institutional issues, successes & failures, and the model for public-private and private-private partnership development	.The docum. of steps and processes, institutional issues, successes & failures, and the model for public-private and private-private partnership is valuable.	.Development steps, institutional issues, successes & failures and business model	.Case study w/ interviews of key staff from agencies & private partners .Review of meeting minutes	.Documentation of findings and lessons learned
.To refine the P-P/P model	.The docum. of a recommended P-P/P business model is valuable.	.P-P/P business model	.Case study w/ interviews of key staff from agencies & private partners .Review of meeting minutes .Team critique	.Documentation of findings and analysis of preferred model

Table 3.1. Preliminary Evaluation Strategy and Hypotheses

Goal #3: To effectively utilize the traveler information to make informed travel decisions

<u>Objective</u>	<u>Hypothesis</u>	<u>MOE</u>	<u>Data Source/ Req.</u>	
.To guide travelers/users to more efficient modes of travel, travel paths, and travel periods.	.The TIS will divert travelers/user to more efficient modes of travel, travel paths, and travel periods (by user type, dissemination means, and free vs. fee-based services).	.Users' perception of travel behavior impacts	.User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Documentation and statistical comparison of survey/interview findings
.To provide travelers/users with flexible travel options	.The TIS will provide multi-modal travel options that will impact travel behavior.	.Users' perception of travel behavior impacts	.User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Documentation and statistical comparison of survey/interview findings
.To define and enhance the value & worth of the traveler information to users	.The TIS will have added value/worth to users (over existing sources)- by user type, dissemination means, and free vs. fee-based services.	.Users perception of value/worth of the traveler information & services	.User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Documentation and statistical comparison of survey/interview findings

Table 3.1. Preliminary Evaluation Strategy and

Goal #4: To provide useful traffic and travel-related information to interregional travelers and other users within the study area.

<u>Objective</u>	<u>Hypothesis</u>	<u>MOE</u>	<u>Data Source/ Req.</u>	<u>Analysis</u>
.To provide reliable, timely, comprehensive, user-friendly multi-modal traveler information to its users.	.The TIS will provide reliable, timely, comprehensive, and usable traveler information to its users (by user type/mode, dissemination means, and free vs. fee-based services).	.Users' perception of reliability, timeliness, comprehensiveness, and usefulness/benefits of services	.User on-site surveys - 10 % sample/period .On-line surveys (WWW-voluntary) .Focus group/Corporate group	.Documentation and statistical comparison of survey/interview findings

4.0 TravTIPS Results

TravTIPS was initially deployed for testing in March 1999, with the test continuing through August 2000. Following the deployment testing, ARINC undertook a media-marketing test in September and October 2000. This latter test was designed to estimate advertising costs for promoting TravTIPS, and to determine what potential revenue sources might be derived from selling advertising on the web site.

Implementation of the proposed TravTIPS services met with considerable difficulties. Although the project did not encounter technical and engineering difficulties, a number of institutional and market issues had significant negative impacts on the proposed service deployment of TravTIPS. This section of the evaluation report summarizes briefly the results of TravTIPS implementation, as compared to initial project plans, for each of the proposed TravTIPS services, as well as the difficulties and barriers encountered with the implementation.

4.1 TravTIPS Services

4.1.1 Internet Services

The web-based service was successfully deployed through TravTIPS.com. ARINC was able to establish private-to-private interfaces with the following:

- Metro/Etak-ARINC – information on geo-coded traffic incidents.
- Accuweather-ARINC – weather.
- Flytecomm-ARINC – flight information.
- MapQuest-ARINC – origin-destination directions.
- SABRE-ARINC – flight reservations and information.
- TravelNow-ARINC – reservations.
- AAA-ARINC – roadside information.
- Inside-ARINC – New York City and Boston local events and tourism content.
- CT Convention Bureau-ARINC – Hartford and general area events and tourism content.

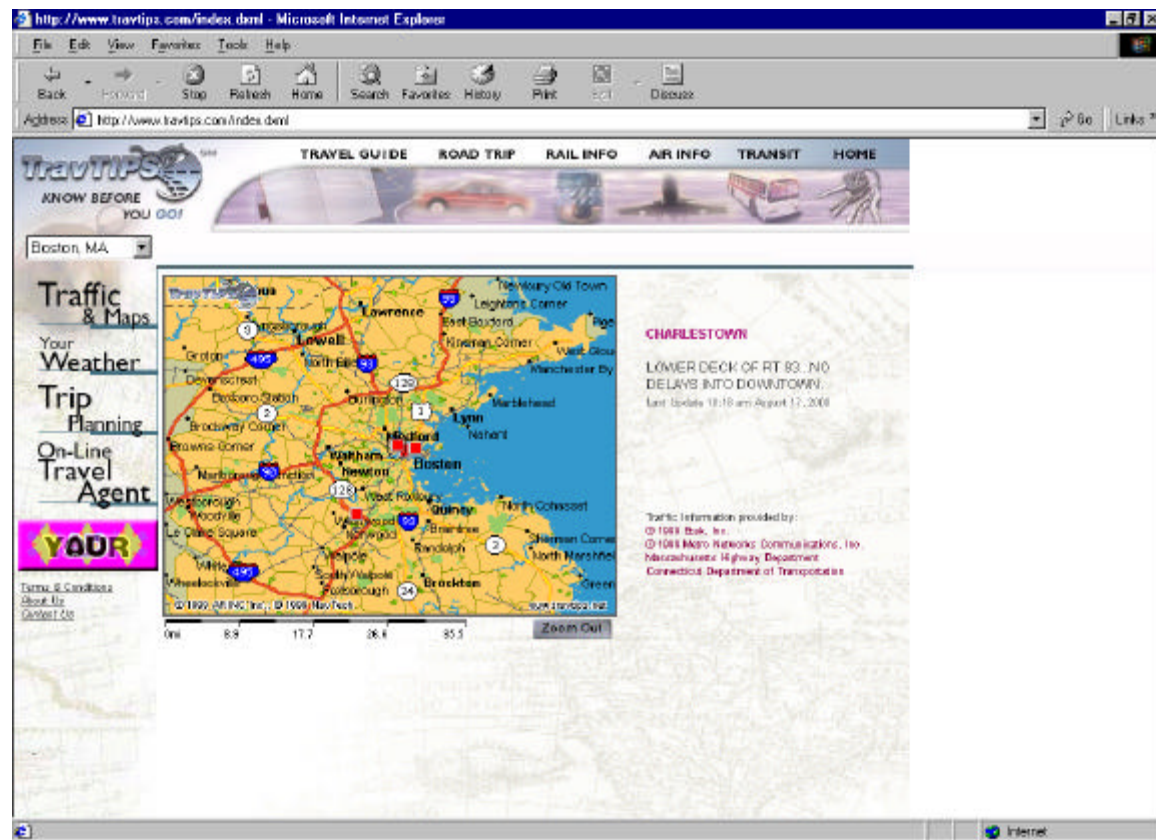
The TravTIPS performance logs show that the website did receive a significant number of “hits” during the operational test. ARINC was not, however, successful in developing interfaces with public sector agencies to obtain direct online data feeds. ARINC was able to negotiate to establish structured web links to existing agency web sites and also was able to receive information about construction in facsimile format, which was manually entered into TravTIPS.

ConnDOT developed, in 2000, an electronic capability to provide this information to ARINC. Although funding was provided by the I-95 CC to build an interface between

TravTIPS and ConnDOT, ARINC was not able to obtain the interface specifications rapidly enough. Therefore, the interface was not developed as had been planned.

The TravTIPS website home page is shown in Figure 4.1. Appendix 1 to the report contains additional screen shots and a narrative description of the web site that was developed for TravTIPS.

Figure 4.1 TravTIPS Home Page



4.1.2 Kiosks

The original TravTIPS plan called for kiosks to be deployed in Penn Station in New York City and South Station in Boston. However, the I-95 CC members who were to provide the space needed for the kiosks were not able to make this space available. ARINC negotiated an alternative delivery mechanism to implement TravTIPS on kiosks deployed by another I-95 CC member (TRANSCOM) but ultimately recommended not to deploy TravTIPS kiosks. The I-95 CC accepted this recommendation.

4.1.3 Intranet/Corporate Services

The Intranet/Corporate services were not deployed. ARINC did invest in the development of information in the TravTIPS database that would be available for distribution to meet the needs of individual corporate customers on a “for-fee” basis, and produced a limited wireless interface for the distribution of this information. However, prior to the deployment of this service, other providers began offering this service without any associated charge or fee. ARINC determined that there was not a viable market for this service, and the I-95 CC decided against deployment.

4.1.4 Integrated Transportation – Making Service

This service was to include the shared white board capability on the I-95 CC’s Information Exchange Network (IEN). ARINC was asked to restructure this offering shortly after development work had begun, and deployed a new collaboration tool in the form of TraDES. TraDES was a mechanism for public agencies to enter, update, cancel and view incidents in the TravTIPS database, and was developed using the MHD current incident reporting forms. However, MHD determined that the tool should not be based on the existing forms, and requested that a collaboration tool be developed based on new functional requirements. MHD also asked that this be submitted for review and approval prior to deployment. This tool was not developed by ARINC due to the cost and the change in functional requirements. In addition, ConnDOT elected not to participate in this aspect of the program.

4.2 Implementation Issues - Institutional

The implementation of TravTIPS was severely hampered by two key issues. The first was the failure of the public-private partnership to achieve the level of cooperation and integration envisioned when TravTIPS was first approved for development. The second was the growth of the Internet, with a number of service providers offering the same service as proposed for TravTIPS without any fee or charge. Examples include MapQuest (maps, directions, traffic, points of interest – national coverage, internet access); Weather.Com (maps, weather – national coverage, Internet access); American Express (travel services – national coverage, Internet access) and offerings by airlines (United, Delta, American – travel services, national coverage, Internet access).

4.2.1 TravTIPS Public Private Partnership

The proposed TravTIPS public-private partnership failed to meet expectations in several key areas. The principle shortcomings in the partnership were as follows:

- **Availability of Data.** Obtaining timely and accurate data was an on-going problem for TravTIPS. ARINC was not able to establish interfaces to allow traffic, construction, and incident data to be electronically downloaded to TravTIPS. This created problems in providing potential TravTIPS users with real-time information. ARINC was required to rely on public agencies providing this data, which was then manually entered into the TravTIPS database. An additional constraint was that TravTIPS relied on data from multiple public partners whose data were limited to a particular partner's operating jurisdiction. Thus, data obtained from one partner would not be complete without similar data being provided by other partners. The reasons for these problems included:
 - i. The availability of data required by ARINC for TravTIPS was not adequately verified with public sector agencies during the planning phase of the project.
 - ii. The documentation of public sector legacy systems and the type of interface(s) that were needed in order to download data to TravTIPS was not completed prior to project implementation.
 - iii. The upfront planning for and design of legacy system interfaces (LSIs) was not done prior to project implementation, with the result that the resources needed for the development of LSIs were not allocated.
- **Uses of Data.** Public sector agencies often use data in a much different manner from those used by commercial and private entities. For example, public sector agencies often will limit or screen what information is made available to the public and when these data will be made available, whereas a private entity often will make information available as quickly as possible to customers. Public agencies often will also provide multiple service providers with the same information, thus limiting the ability of a private entity to obtain a fee or service charge for providing this information. These differences in the uses of data were not resolved in the TravTIPS operational model.
- **Changes in Commitments.** TravTIPS was developed with certain operational concepts that were not implemented. Examples of these included the decision not to deploy kiosks, which ARINC had identified as one potential source for developing a revenue generating service, and the decision by MHD to change the specifications of the proposed TraDES tool.
- **Differences in Business Styles.** Public sector agencies historically have contractual relationships with private entities in which the former define terms and conditions for the latter. Working together as partners is a new way of doing business, and the model for this type of operation is still evolving. For example, one public sector agency wanted ARINC to have each incident approved by the agency before the information could be posted on the TravTIPS web site. This included incidents

reported by commercial data feeds. This type of requirement posed an unmanageable burden on TravTIPS.

4.2.2 TravTIPS Business Model

Perhaps the most significant hindrance to the successful implementation of TravTIPS was the growth of the Internet. The TravTIPS business model was predicated on the assumption that ARINC would integrate and make available information not only on congestion and incidents, but also for a wide variety of other services. However, other service providers entered the market and provided much of this information at no charge or fee. Examples include American Express (nationwide coverage for travel, points of interest, weather, directions – Internet access); the airlines (nationwide coverage for reservations, links to other travel/hotel/car services – Internet access); and, Internet service providers (AOL, Yahoo!, Excite – links to travel/hotel/care, directions, weather, with Internet access). Even though this information may not have been integrated as was proposed by TravTIPS, the availability of this information significantly reduced the potential market for TravTIPS' services. The value of the information to be provided by TravTIPS could not clearly be differentiated from data available through other service providers.

In January and February 2000, ARINC retained the services of Andersen Consulting to undertake an extensive review and analysis of the TravTIPS business model. The conclusions of this study, summarized in Table 4.1, further demonstrated the lack of a market for TravTIPS' services.

The final conclusions of the study conducted by Anderson Consulting, summarized below, contributed to a decision by ARINC not to deploy TravTIPS as an ATIS product following the completion of the FOT:

- The market for disaggregated travel information was already very crowded, and there was limited evidence that aggregated travel information would have significant market value.
- The market for wireless services is also quite crowded, with existing service providers, including companies such as ATT Wireless and Bell Atlantic. These service providers were already offering many of the services proposed by TravTIPS.
- An estimated \$43 million in additional investment would be required to establish TravTIPS as a viable business entity with a national market. Much of this additional investment would have been required for a nation-wide advertising campaign designed to promote TravTIPS as a recognizable "brand name" service.
- Even with this significant advertising investment, the study estimated that TravTIPS would not be profitable until 2003, and would not generate a Return on Investment within a five-year period.

Table 4.1 TravTIPS Strategic Assessment Model Results

	<div> <div>Positive</div> <div>Neutral</div> <div>Negative</div> <div>Insufficient Information</div> </div>
1. Is TravTIPS appealing from a customer perspective?	
Does TravTIPS solve a problem for customers?	Positive
Does TravTIPS have a successful track record?	Neutral
Does TravTIPS integrate the right information?	Neutral
2. Can TravTIPS beat the competition?	
Are there comparable services planned or already on the market?	Negative
Does TravTIPS have unique strengths with respect to the competition?	Neutral
Is the technical expertise in place?	Positive
Have key partnerships been forged?	Negative
3. Is the TravTIPS Business Model executable?	
Is the management team in place?	Negative
Is the business model scalable?	Insufficient Information
Will the concept work is TravTIPS is spun off from ARINC?	Positive
4. Will TravTIPS be profitable?	
Are revenue forecasts high and valid?	Negative
Are cost forecasts low and valid?	Neutral
Will financial performance be attractive to investors?	Negative
5. Can TravTIPS be funded as an arrangement acceptable to ARINC?	
Can TravTIPS be funded without further investment by ARINC?	Negative
Can ARINC be fairly compensated for its investment to date?	Insufficient Information
Can TravTIPS be funded quickly enough?	Negative

Source: SAIC Notes, ARINC Presentation to I-95 Corridor Coalition ATIS Meeting, April 2002.

4.3 Implementation Issues – Technical

From a technical perspective, the TravTIPS deployment was successful. The system architecture was designed to accommodate both the initial web site as well as the planned

expansion of services. A significant effort was required to ensure that the service remained up and running, but in general, the TravTIPS legacy system was reliable. The performance logs from the operational test demonstrate that the legacy system did not experience significant unscheduled down time, that is, the system did not seem to “crash” unexpectedly and remained available to potential customers. Reliability problems generally were with external data sources and associated interfaces.

Particular aspects of the technical implementation that provide lessons learned include:

- ARINC found that off-the-shelf web site statistical reporting software did not adequately meet the needs of TravTIPS. ARINC instead used customized routines to support TravTIPS.
- The design that ARINC initially intended to use to provide information on incidents and construction was found to be the proprietary feature of another ATIS. TravTIPS instead designed a “click-on” icon system to provide this information, however, this system was found to be cumbersome.
- ARINC was required to update TravTIPS through manual data entry. This was done daily, and became a significant undertaking.
- ARINC made over 30 software enhancements to improve the web site during the FOT. ARINC’s experience was that this type of on-going system enhancement would be a feature of any ATIS deployed as a production system in order to keep the system responsive to market demands and customer requirements.
- The URL that ARINC wanted to use (TravTIPS.com) had already been taken when the web site was established. ARINC recommended that any future effort to use a “brand” name should be established before the system is introduced.

5.0 Evaluation Findings

The initial evaluation strategy developed for the TravTIPS project included four goals with supporting objectives, measures of effectiveness, data sources, and analytical techniques. The evaluation goals were developed in anticipation of the evaluation of a fully implemented service. However, as noted in Section 3.0, the focus of the evaluation effort changed as a result of the decision to not deploy TravTIPS. Although the quantitative data anticipated in the evaluation strategy were not available, the qualitative findings of the evaluation are of interest when contrasted with the proposed goals.

This comparison of evaluation findings with the proposed evaluation goals is shown in Table 5.1.

Table 5.1 Proposed Evaluation Goals and Evaluation Findings

Proposed Evaluation Strategy Goal	Supporting Objectives	Evaluation Findings
Define the marketability and sustainability of the ATIS program on a regional basis.	1. Identify program marketability and sustainability.	The TravTIPS project did not demonstrate that a viable market exists for a regional TIS service. The growth of the internet enabled “brand” name companies, with nationwide service offerings, to capture the regional market that ARINC anticipated developing for TravTIPS.
	2. Define benefits of ATIS to stakeholders/users.	Although TravTIPS was not successful, a substantial market for ATIS and TIS services has developed. The business model for these services, however, is based on a “free” offering, that is, companies offering these services as part of doing business. No fee-based service has been successful.
	3. Improve transportation services through the use of Traveler Information Systems (TIS).	The TravTIPS FOT did not appear to improve transportation systems directly.
	4. Provide/maintain functional processes in the exchange of TIS information.	A major problem facing TravTIPS was that these functional processes were not successfully developed. Problems with obtaining data on a regular basis from stakeholder agencies were not successfully resolved.
	5. Document associated costs.	ARINC did invest substantial capital in system development, but an accurate cost accounting was not developed. The reason for this is the decision not to deploy the system.

Enhance the Understanding of the Process to Develop and Maintain Public-Private Partnerships (P-P P) ¹	<ol style="list-style-type: none"> 1. Document development steps, processes, institutional issues, successes, and failures and the model for P-P P. 2. Refine the P-P P model. 	<ol style="list-style-type: none"> 1. The roles and responsibilities of all partners, public and private, must be clearly defined and agreed to. Of particular importance is agreement on what each will provide, when this will be provided, and the format/standard in which this will be provided. 2. A process must be established for the ready resolution of issues, concerns, and disputes. A drawn-out process for decision-making can jeopardize the ability of the private partner to respond to market forces. 3. A public sector champion is needed to “push” the project along by keeping stakeholder participation in place, insuring that services are provided as agreed, and that issues are addressed. <ol style="list-style-type: none"> 1. The P-P P model must be flexible so that the private sector partner can respond to market forces. 2. Public sector partners must be flexible in viewing the “scope of work” for the partnership as something other than a contract deliverable, and not hold private sector partners to “contractual services” that are not market responsive.
Effectively Utilize the Traveler Information to make Informed Travel Decisions	<ol style="list-style-type: none"> 1. Guide travelers/users to more efficient modes, routes. 2. Provide flexible travel options. 3. Define, enhance the value and worth of traveler information. 	The growth in competing services demonstrated the demand for providing travelers with information on more efficient modes and routes of travel while also providing flexible travel options. What did not develop, however, was the demand for a fee-based service offering a single point of access for obtaining this information. Consumers appear willing to access multiple web sites to obtain this information at no charge, but do not appear willing to pay to obtain this information from a single ISP.
Provide Useful Traffic and Travel-Related Information to Inter-regional Travelers and Other Users within the Study Area	Provide reliable, timely, comprehensive, user-friendly multi-modal travel information to users.	The TravTIPS service did not meet this goal. As discussed in Section 4, full services were not implemented, and the data needed to provide this service was not readily available.

¹ A more detailed discussion is included in Section 5.

6.0 Comparative Analysis of Evaluation Findings

In many ways, the TravTIPS project was a cutting edge project, in that it was one of the initial tests of a public-private partnership for deploying ATIS. The lessons learned through the implementation of the TravTIPS FOT will be of significant benefit to future deployments of ATIS, as well as future public-private partnerships established for the deployment of information technology and services. To this end, the TravTIPS FOT was a successful test of:

- The public-private partnership model used the by the I-95 CC, member agencies, and ARINC.
- The sustainability of the business model (ATIS services based on fees and user charges) proposed by ARINC as well as the testing of the potential market and business environment for these types of services.

Even though TravTIPS was not deployed as a production system, the lessons learned from the FOT are a valuable resource for the future development of the ATIS industry. The evaluation team determined that contrasting the “model deployment” discussed in the document “Choosing the Route to Traveler Information Systems Deployment: Decision Making Factors for Creating Public/Private Business Plans”² with the TravTIPS implementation experience would be a useful exercise to highlight lessons learned. Also, the evaluation team has conducted a literature review comparing TravTIPS implementation experience with the traveler information systems deployed as part of the Metropolitan Model Deployment Initiative site evaluations. The intent was to identify common themes and lessons learned that, again, would be beneficial for future deployments to consider.

This section of the report presents the results of these two comparative analyses.

6.1 TravTIPS and “Choosing the Route”

The publication, “Choosing the Route to Traveler Information Systems Deployment: Decision Making Factors for Creating Public/Private Business Plans, summarizes well the issues facing a public-private partnership for the deployment of ATIS, and includes recommendations on how to address these through the business planning process. The TravTIPS deployment experience has successfully tested a number of the model deployment strategies discussed in this publication, and the experience gained through the implementation of TravTIPS will be of significant benefit to future ATIS and public-private partnership projects. Contrasting the TravTIPS implementation experience with the model deployment strategies outlined in this document highlights the institutional and

2 Washington State Transportation Center “Choosing the Route to Traveler Information Systems Deployment: Decision Factors for Creating Public/Private Business Plans”, ITS America, Inc. in association with the U.S. Department of Transportation, 1998.

business planning issues that had impacts on the FOT and is a useful way of presenting the evaluation findings. This approach also helps to identify issues that future deployments will need to address in order to help ensure successful implementation of public-private partnerships.

The results of this comparative analysis are presented in Table 6.1. The presentation of the analysis identifies findings from the evaluation and compares the model approach outlined in the “Choosing the Route to Traveler Information Systems Deployment” and the TravTIPS implementation experience to each finding. The model approach column presents the “ideal” conditions that need to be met for the successful deployment of ATIS using a public-private partnership model. TravTIPS implementation experience column contrasts the actual experience from TravTIPS with the model approach to deployment.

Table 6.1 Comparison of “Choosing the Route” and TravTIPS

Evaluation Finding/Issue	“Choosing the Route to Traveler Information Systems”: Model Approach	TravTIPS implementation experience
ATIS Market – Rapidly Changing	<p>Business plans and relationships should be designed to accommodate changes in the market, with an ability to add and subtract partners and services.</p> <p>Short-term, fee-for-service revenue streams are unlikely; some public subsidy will be required to support ATIS information structure.</p> <p>Public agency activities are geared toward traffic management with a corridor-based approach. The private sector requires a larger market with broader sources of information. These differences need to be addressed to make ATIS attractive for private sector investment.</p>	<p>Initial deployment activities were modified – kiosks and corporate services were not deployed. The business plan was modified accordingly.</p> <p>The I-95 CC provided funding for development of interface between ConnDOT and TravTIPS. TravTIPS also relied on public information sources to obtain data.</p> <p>TravTIPS was designed as a regional ATIS, with data requirements much broader than those required for public agencies. ARINC experienced problems in obtaining regional data on a timely basis from public sector agencies. The differences in missions were not resolved.</p>
Differences in Perspective	<p>Private sector – profit-oriented Public sector – service-oriented</p> <p>The business plan will need to recognize these differences and understand what is important to each participant, and create a mechanism for resolving these differences. Open channels of communication also need to be established.</p>	<p>This differences between public and private sector orientations were not successfully resolved in TravTIPS. Public sector agencies did not have significant experience in working with a private sector entity on a partnership rather than contractual basis. Because of this lack of experience, some issues were addressed on a reactive basis as they were identified rather than being addressed proactively. In addition, information provided to ARINC was also provided to other ISPs who competed for the TravTIPS market.</p>
Function of	Clearly define the function of the	This issue was not fully resolved

ATIS	ATIS, including clearly defining “core tasks” of the ATIS, and determining who is responsible for ensuring that these tasks are implemented.	for TravTIPS. Public sector agencies and ARINC did not determine what data should be collected, how this should be done, and who had the responsibility for ensuring that these tasks were successfully completed prior to project implementation. An example is MHD’s decision not to deploy TravDES after the system had been designed.
Business Plan Development – Institutional Relationships	Initial planning should focus on public sector agencies that control information infrastructures. Once this role has been clarified and public sector agencies have determined how to treat the private sector agencies, private sector can make business decisions related to entering the market.	<p>ARINC took the lead on defining the market for TravTIPS, and developed a business plan based on certain expectations about public sector participation. When these expectations were not realized (the decision not to provide space for kiosks at South and Penn Stations), ARINC was required to either not implement certain project components or find alternative delivery mechanisms.</p> <p>Addressing these issues was done on a reactive rather than proactive basis. This led to increased investments on the part of ARINC (development of TraDES) and changes in implementation that ultimately had a negative impact on the business plan (the decisions not to deploy corporate services and kiosks, as examples).</p>
Complexity of Business Planning Process	Business planning should be an iterative process, and requires strong support from the public sector.	<p>TravTIPS had strong public sector support, but did not have a full-time public sector “champion”.</p> <p>The public sector agencies viewed the ARINC business plan as static, contractual document rather than an iterative document.</p> <p>Public sector agencies at the</p>

		senior management level were not involved in the development of the plan and lacked ownership.
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6.2 Peer to Peer Analysis

This section presents a peer-to-peer analysis of the TravTIPS ATIS. A summary of lessons learned is provided based on the evaluation of various ATIS projects associated with deployments that were selected to serve as national models for operating ITS in metropolitan areas. Then, user requirements identified during the conceptual design phase of the TravTIPs project are compared to the functional capabilities of the deployed ATIS.

The USDOT designed the Metropolitan Model Deployment Initiative (MMDI) to foster public-private partnerships to showcase fully integrated metropolitan-area ITS infrastructure. From a 1996 notice in the Federal Register, USDOT selected four sites to receive approximately \$39 million in Federal funding for this initiative. The four sites selected were Seattle, Washington; Phoenix, Arizona; San Antonio, Texas; and the New York/New Jersey/Connecticut (NY/NJ/CT) area. Non-Federal partners funded approximately 50 percent or more of the project costs.

A series of rigorous evaluations of the MMDI sites yielded significant results in the form of performance benefits, cost, and overall program assessment guidance. These “lessons learned” from the region-wide approaches to transportation management, integrated ITS and traveler information systems were documented in a draft USDOT report³. The major ATIS related findings from this report have been synthesized and are presented in Table 6.2.

Table 6.2 Lessons Learned from ATIS Deployments Associated with the Metropolitan Model Deployment Initiative Sites

Evaluation Finding	Comment
1. ATIS were found useful in reducing traveler delays.	While the MMDI evaluators found the greatest reductions in traveler delay resulting from applications of signal coordination and incident management, traveler information systems also led to decreased traveler delay.
2. In developing the regional ITS architecture and designing the site’s data repository, ensure that a consistent message set is developed among the	Message sets must be consistent across jurisdictions, geographical boundaries, and from one scenario to the next. For example, terms such as “10-minute delay” or “1 lane

³ “Twenty Questions and Answers About Deploying and Operating an Integrated Intelligent Transportation Systems: Guidance from the Evaluation of The Metropolitan Model Deployment Initiative Sites,” Draft undated report, U.S. Department of Transportation.

<p>various data providers.</p>	<p>closed ahead” need to have the same definition when entered into the system by traffic operators or emergency responders. This is especially important when dealing with ATIS, where it is important to gain and build the public's trust.</p>
<p>3. The single most successful type of ITS application observed during the model deployments was the provision of traveler information through real-time traffic condition websites.</p>	<p>Publicly funded websites that provide a combination of traffic congestion maps and users as providing the largest benefit rated access to real-time video images of the roadway system. Contributing to their success are the facts that: Traveler information websites are relatively inexpensive. Data that drive the sites (e.g., video images, traffic speeds) are already being collected for traffic management operations. Website applications provide real benefits to users (e.g., reductions in delay, fuel consumption, and crash risk). Websites reach a broad and increasingly growing market (e.g., average number of user sessions per day have doubled in many areas where they have been deployed over the course of one year).</p>
<p>4. There were a number of additional ATIS application success stories, and these accomplishments pertain primarily to the different types of Web services offered.</p>	<p>Examples of additional traveler related improvements include: <i>Point-to-point freeway times:</i> One site reported an increase in usage from a total of 7.5 million “hits” over a four and one-half year period, to 32.5 million “hits” in a single year, after adding point-to-point freeway travel time estimates. <i>Web application for transit users:</i> Applications that allow riders to track their buses and to anticipate arrival times at a given stop have resulted in page “hits” as high as 112,000 per</p>

<p>5. In addition to the ATIS success stories, there were also a number of ATIS applications that fell short of expectations.</p>	<p>day.</p> <p><i>Web application for roadway conditions:</i> Information on maintenance, weather, and road closures in a common database that other jurisdictions view and that the traveling public share have proved to be very popular, and can lead to more effective and less costly maintenance operations, reduced traffic delays, and increased safety for travelers and roadway workers.</p> <p><i>Improvements in traditional media communications:</i> Co-location of television and radio at traffic operation centers has led to more accurate traffic reports and cost savings for the media providers. For example, the constant requests for additional cameras have led to a reduction in the need for aerial monitoring.</p> <p>The ATIS applications that did not work as well as expected include:</p> <p><i>Traveler information kiosks:</i> High operating and maintenance costs, and the ready availability of the Internet and wireless technology have led to their failure.</p> <p><i>In-vehicle navigation (IVN) devices:</i> Nationally, IVN units have failed to move beyond small niche markets in luxury vehicles and rental cars. Obstacles to wider acceptance include relatively high cost of the systems, continued gaps in data coverage that impede the devices from accurately determining real-time routing information, and difficulties with poorly designed human-machine interfaces.</p> <p><i>Broadcast fax and pagers:</i> Personalized traffic information messaging services were abandoned at all of the MMDI sites. Reasons cited include insurmountable technical problems, the service's for-fee component, and the evolving and hence</p>
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	<p>unstable wireless communications market.</p> <p><i>Wireless hand-held devices:</i></p> <p>Where deployed, this service has experienced extremely low market penetration. Part of the problem was ever-changing technology and poor human factors which resulted in a high level of user knowledge and effort to operate.</p> <p><i>Traffic television:</i></p> <p>Dedicated cable broadcasts of current traffic conditions experienced an extremely low number of viewers. The lack of media advertising for the “availability” of this service, paired with an inconsistent programming schedule and a monthly user fee were cited as the major reasons for this applications failure.</p>
<p>6. User surveys revealed insights into the specific likes and dislikes of the traveling public with regard to ATIS.</p>	<p>Customer preferences revealed the following with regard to traveler information:</p> <p>Customers want the following services (in priority order from highest demand to least demand):</p> <ul style="list-style-type: none"> Freeway and arterial coverage Direct traffic speeds (or reliable self-selected point-to-point travel times) Camera images Incident information En route guidance based on personalized criteria Design features according to media and location of use. <p>If fee-based ATIS is to succeed, it must provide value to customers every day.</p> <p>Low quality traffic information is typically ignored. High quality data is preferred and sought out.</p> <p>The demand for traffic information is higher in</p>

<p>7. User surveys revealed insights into the specific likes and dislikes of transit users' with regard to transit information.</p>	<p>more congested cities than in less congested areas. Positive experiences with ATIS results in higher individual site usage rates. Customers demand fast and convenient service, regardless of the ATIS platform.</p> <p>Transit users revealed the following preferences with regard to ATIS: Real-time information on bus location and delays (via the Web, phone, en route at bus stops, or by monitor at locations near transit centers) is desired by users. More detailed information on routes, including maps and point-to-point itineraries. No fee for use. Transit riders are not interested in paying for better information systems.</p>
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A review of Table 6.2 reveals two major similarities between the lessons learned with regard to traveler information systems (TIS) deployed as part of the MMDI and those planned for the TravTIPS project. Both projects found that web-based services that provide near real-time assessments of roadway conditions via traffic congestion maps provided the largest benefit to users. On the other hand, traveler information kiosks fell short of expectations. High operating costs and the ready availability of Internet and wireless technology led to their failure at the MMDI sites. For TravTIPS, the two sites that had planned to install kiosks ran into space problems, so these traveler information systems were never deployed.

As part of the planning process for the TravTIPS project, a study was commissioned to develop the conceptual system design and define the requirements for a Corridor-wide ATIS⁴. The study concluded that a Corridor-wide TIS would succeed if the following conditions were met:

- The information it makes available composes a critical mass.
- The information it collects and makes available spans virtually all jurisdictions.

⁴ Project No. 8, Conceptual System Design for a Corridor-wide Traveler Information System, Loral, January 1996.

- It is structured (both technically and institutionally) so as to offer a multitude of opportunities for entrepreneurial intermediaries to provide traveler information to end-users.
- The information it collects and makes available integrates all modes of interest to the end user.

This last condition is critical to the success of any system. The user, regardless of cost, availability or benefits, will reject systems that do not meet users expectations. A TIS that does not provide enough of the information a traveler needs will languish from lack of use. While it is impractical to field a system that offers all possible information for all locations in a Corridor, it is realistic to deliver a system that satisfies the majority of user requested information. Recognizing the importance of satisfying user needs, a Requirements Analysis was conducted as part of the I-95 CC design process. This analysis served as the underlying foundation for the conceptual system design.

One of the objectives of the Requirements Analysis was to identify the information needs of the travelers in the corridor – the user requirements aspect of the TIS. To this end, specific user service goals were developed. For each goal, a number of supporting objectives, or high-level user requirements, were identified. These user service goals and their accompanying user requirements were ranked according to how the Corridor’s transportation agencies viewed their importance. By contrasting the service goals and objectives identified by the users with the functional capabilities offered by the TravTIPS TIS, it is possible to see how responsive the deployed ATIS configuration was in satisfying users and travelers needs. The results of this comparative analysis are presented in Table 6.3. The table presents the user service goals and their associated user requirements (ranked by importance by the I-95 CC transportation agency stakeholders) as identified in the Loral study, along with the functions present in the TravTIPS ATIS. The comparison reveals that while many of the user requirements were met, the functionality provided by the TravTIPS Internet services was not as transparent as users would have liked. This problem was exacerbated by the lack of online data feeds to public sector agencies.

Table 6.3 Comparisons of TIS User Service Goals and Requirements with TravTIPS Functionality

User Service Goals⁵	User Requirements³	TravTIPS Capabilities
1. Enhance urban and interurban corridor road travel for various roadway users: <ul style="list-style-type: none"> • Business travelers • Tourists 	Provide timely and accurate information on the following, to both pretrip (home, workplace, transit stops, rest stops, public locations) and enroute (in-vehicle) users:	A majority of these (pretrip) requirements have been met by the Internet Service via web links to existing web sites.

⁵ Ranked by users in order of desirability.

<ul style="list-style-type: none"> • Commuters • CVO/dispatchers • Transit/Para transit operators 	<ol style="list-style-type: none"> 1. Real-time incident/congestion summaries. 2. Traveler advisories. 3. Road weather conditions. 4. Construction summaries. 5. Alternate routes and modes. 6. Real-time link status. 7. Route guidance information. 8. Parking availability. 9. Parking locations. 10. Intermodal transfer points. 11. Trip planning capability. 12. Road environmental conditions. 	<ol style="list-style-type: none"> 1. Provided, but insufficient detail. 2. Provided, however many advisories are cryptic, others are viewed as non-essential. 3. Provided. Excellent all around. 4. Provided, but not updated often enough. 5. Unknown 6. Provided 7. Provided 8. Unknown 9. Unknown 10. Unknown 11. Provided, however driving directions does not work. 12. Provided
<p>2. Enhance modal and intermodal travel for various urban and intercity mass transit users:</p> <ul style="list-style-type: none"> • Bus & subway travelers • Air travelers • Rail travelers • Ferry travelers 	<p>Provide timely and accurate information on the following, to both pretrip and enroute users:</p> <ol style="list-style-type: none"> 1. Schedule, route, and fare information on all transit modes (bus, train, subway, air, ferry). 2. Real-time status location information on transit modes (bus, train, air, subway, ferry). 3. Para transit services. 4. Ride-matching services. 	<ol style="list-style-type: none"> 1. Provided, but mostly via link to third part sites. 2. Provided, but mostly via link to third part sites. 3. Unknown 4. Unknown 5. Provided, via link to

<p>3. Enhance the Safety of travelers.</p> <p>4. Increase the availability of traveler information</p> <p>5. Increase tourism</p>	<p>5. Trip plans.</p> <p>6. Modal travel time comparisons.</p> <p>Provide timely and accurate information on the following, to both pretrip and enroute users:</p> <ol style="list-style-type: none"> 1. Locations of hospitals. 2. Locations of emergency telephones. 3. Locations of repair shops. 4. Locations of police. <p>Provide timely and accurate information on the following, to both pretrip and enroute users:</p> <ol style="list-style-type: none"> 1. Regional weather conditions. 2. Food/dining and gas information. 3. Lodging. 4. Regional environmental conditions. <p>Provide timely and accurate information on the following, to both pretrip and enroute users:</p> <ol style="list-style-type: none"> 1. Special events. 2. Attractions. 3. Historic sites. 4. Festivals. 5. Parks and recreational 	<p>other web site.</p> <p>6. Not provided</p> <p>1. Not provided.</p> <p>2. Not provided.</p> <p>3. Not provided.</p> <p>4. Not provided.</p> <p>1. Provided.</p> <p>2. Provided, but not very useful as user is required to type in restaurant in order to get directions.</p> <p>3. Provided.</p> <p>4. Provided.</p> <p>General area events and tourism information is provided via information from local Convention Bureau.</p>
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	<p>facilities.</p> <p>6. Cultural and arts activities.</p> <p>7. Educational institutions.</p> <p>8. Resorts.</p>	
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7.0 Conclusions

The business model proposed for TravTIPS was unique in that TravTIPS proposed to deploy a regional ATIS that provided information about multiple transportation modes. TravTIPS, as proposed, would not only have provided not only trip information, but was designed to enable customers to use this information to make informed travel-related decisions. In addition, TravTIPS proposed the distribution of this information over multiple channels. What made the TravTIPS proposal unique was that no other ATIS deployment had reported being a sustainable business, or had offered the multiple levels of services proposed for TravTIPS. Although ARINC has made a business decision to not deploy TravTIPS as a commercial venture, the FOT has provided a wealth of valuable lessons learned that will be beneficial to future ATIS and other ITS deployments as well as for future public-private partnerships.

The TravTIPS FOT was developed to provide hands-on deployment experience to address the following four issues:

- Sustainability. Does a regional ATIS model support a sustainable business? What factors affect the sustainability?
- Public-Private Partnership. What are the institutional issues and challenges associated with deployment of a regional ATIS?
- ATIS Business Environment. What are the technical and business issues associated with the deployment of a regional ATIS?
- Effects of this FOT. Can this program increase the involvement and awareness of ATIS to other private sector firms?

This section of the evaluation report presents conclusions derived from the TravTIPS deployment experience. These conclusions are derived from the results of the stakeholder interviews, the review of performance logs from the operational test, the review of other project documents, and from participation in project-related meetings. These have been developed with the intent of addressing the four questions posed above.

Conclusion #1: Public-private partnerships must be developed with the flexibility necessary for private partners to generate a return on investment. In addition, the roles and responsibilities of all partners must be clearly defined prior to project implementation and a public sector champion must be identified and empowered.

Public-private partnerships, in order to be successful, should consider addressing the following on a proactive basis:

- a. When developing project goals and objectives, and in particular when developing a business model, all involved stakeholders should be included in the process. This will help stakeholders take ownership of the project and enable the identification and resolution of many potential institutional barriers and issues prior to actual deployment.

- b. The roles and responsibilities of each stakeholder must be clearly defined and agreed to prior to implementation. As part of this, a mechanism for addressing and resolving issues/disputes must be established.
- c. A public sector project leader(s) should be identified and empowered with the authority to make decisions regarding project implementation.
- d. The conflicting missions of the public (service orientation) and private (profit orientation) sectors must be resolved in a way that enables the private partner to generate adequate return on investment.

The TravTIPS project highlighted the differing approaches to project management between the private sector (profit orientation) and the public sector (provision of services). A process for resolving project-related issues does was not successfully developed, although there was good communication between all stakeholders throughout the course of the project. The result was that decisions involving changes in project scope or deliverables could not be made in a timely manner, and ARINC was not able to respond to market demands as necessary.

Conclusion #2: The business plan should be flexible enough to enable private partners to respond to changes in market conditions. The business plan also should include market research.

The business plan should not be viewed as a static “contract deliverable” type of document, but should instead be developed so that private partners are provided the flexibility needed to adapt to changes in market conditions. The business plan should also address the following:

- Potential procurement, statutory, regulatory, and administrative issues should be identified and addressed in the plan. Agreement on proposed resolutions should be obtained from all stakeholders prior to project deployment.
- Funding sources need to be clearly identified and commitments obtained (to the extent possible) regarding any potential public funding of a project.
- Technical issues that will potentially impact the success of a project should be identified and addressed through the business planning process.

The business plan should also include an assessment of the potential market for services based on market research. Proactively identifying potential customers and revenue sources will help determine what services should be offered, how these services should be offered, and the level of quality needed to establish and maintain a customer base. This market research should be conducted prior to implementation so that services provided can be tailored to specific needs and customers. In addition, this market research will also help identify what type of advertising and outreach is needed to promote services.

As discussed in more detail in Conclusions 5 and 6, the TravTIPS project was negatively impacted by inadequate market research prior to implementation. This is reflected in the

estimated advertising expenditure that would have been required to establish TravTIPS as a recognized product name.

Conclusion #3: Procurement processes must be structured so that private vendors can respond to changes in market conditions. The Scope of Work governing a public-private partnership needs to be viewed as a flexible document rather than a statement of fixed deliverables.

The contractual agreement established between ARINC and the I-95 CC contained a statement of work and a listing of services to be provided through the project. ARINC was held responsible for providing certain services (such as kiosk-based traveler information services in New York and Boston) even when there was not a clearly defined market or need for these services to support the contractual agreement to provide these services. This highlighted a significant philosophical difference in approaches to procurement between public and private sector groups. Public sector groups generally procure services based on a bid process that includes a clearly defined scope of work and expected project deliverables, while the private sector prefers flexibility to respond to market conditions. A resolution of this difference was not achieved, with the result that ARINC was held to a scope of work that did not respond to changes in the market. Added flexibility in the procurement process to enable private vendors to respond to market conditions is needed to ensure the success of future such partnerships.

Conclusion #4: Data sharing agreements and data standards must be proactively established.

Public sector agencies generally provide ATIS-related information to ISPs. While this service orientation is consistent with their mission, it contributed to a situation wherein information that ARINC was attempting to package and offer as part of a fee-based service was made available to other ISPs at no cost. This had the effect of diminishing the value of the information being offered by ARINC.

An additional consideration is that raw data are collected by different agencies using a variety of sources without a common standard. This makes the integration of data to create added value (the TravTIPS model) more expensive and time consuming, and can create problems for providing real-time information. Standards developed subsequent to the TravTIPS initiative that govern the collection and transmission of traffic information would have helped to address this problem.

Conclusion #5: There does not appear to be a viable market for integrated, regional ATIS services available for a fee. In addition, Internet-based advertising revenues do not appear to be as strong a funding source as anticipated at the beginning of the FOT.

At the time the TravTIPS project was conceived, none of the stakeholders anticipated the tremendous growth of Internet-based traveler information services. The ISPs offering

competing sources of traveler information include not only the private sector, but also many public sector agencies. While these competing services are not integrated in the manner in which TravTIPS initially proposed, these services are available without any service charge.

Most state DOTs offer Internet-accessible information on traffic congestion and construction information. There are numerous private vendors offering a wide range of traveler services, including but not limited to:

- Travel/Room/Car - most major airlines, American Express, Travelocity, Priceline, Hertz, Amtrak;
- Weather – Weather.com, LA Times, NY Times, MSNBC;
- Directions – MapQuest, MapBlast, Chicago Tribune, CNN, Yahoo, AOL (the latter two through links), and American Express.

This list is far from complete, but does show the degree of market penetration for traveler information services that were to be offered through TravTIPS. As mentioned previously, these services are available without any fee or service charge, thus putting the TravTIPS business model at a competitive disadvantage. In addition, the growth in these services has also saturated the market for advertising. The competitive disadvantage of the TravTIPS business model has also created a disincentive for advertisers to select TravTIPS as a potential service provider, significantly reducing one of the major revenue streams projected by ARINC. Finally, the bursting of the Dot.com bubble resulted in a substantial contraction in the amount of Internet advertising.

Conclusion #6: Any ATIS service that provides a fee-based service must have developed a market niche with a service that is unique from other, non-fee based services, or must have national recognition as a brand name to attract and keep customers.

As can be noted, many of the current internet-based service providers represent nationally recognized brand names. TravTIPS did not have this level of name recognition. Recognizing this drawback, ARINC commissioned Andersen Consulting to conduct an objective review of the TravTIPS business model. Anderson Consulting estimated that an investment in excess of \$40 million would be required to promote TravTIPS as a national provider of integrated traveler information services. The analysis further estimated that TravTIPS was unlikely to produce a return on investment within the near future (estimated to be 5 years at the time of the study).

Given the fact that TravTIPS was already competing in a market with numerous vendors offering similar services without a user fee or service charge, ARINC determined that this level of investment was hard to justify. Many of these vendors are offering ATIS services in association with other services, and have filled the market niche that ARINC had hoped to develop for TravTIPS. A regional ATIS model that is based on for-fee services and that does not have a unique market niche or brand-name recognition, does not appear to offer a sustainable or viable line of business. Private sector firms

considering a venture into the ATIS market will need to address these issues prior to deployment in order to ensure revenue streams capable of justifying and supporting investment of funds.

Appendix 1: TRAVTIPS WEB SITE DESCRIPTION

Links on the Left-Hand Side

Notes: Boston, Providence, Hartford, New York – Despite the various locations, all links lead to the same pages with slight variations: such as “Places to Eat” and “Things-To-Do/Local Events” will be specific to each individual region.

On the Traffic & Maps:

- Some incident messages are cryptic and non-essential.
- Construction incident messages are not being updated often enough.
- Legend disappears once the mouse is moved – would prefer to see it stay.
- The placement of construction incidents does not match the location description.
- Not enough detail (major routes) at the zoomed-in lower level.

Your Weather:

- Excellent all-around – useful & informative.

Trip Planning:

- Driving Directions – Does not work. Error message is too small and located at the bottom.
- Check for Flight – Requires registration/login to Travel Velocity.com.
- Train Reservations – Requires login to Amtrak.
- Places To Eat – Gives a search screen where user can type in the restaurant name and location. If you were a traveler, this would be useless – as you don’t know what restaurants are located where you are traveling. However, it is excellent for finding the phone number/address to a restaurant you might know about in the area. Would like to see recommendations.
- Places to Sleep – Gives a page with list of area hotels and prices. – excellent.
- Rent a car – Search page with specifications of what type of car, date, etc. Good.
- Things to do/Local Events – Sends the user to a 3rd party website with information on the city, local events, etc. Great resource.

Online Travel Agent:

- Travel Agencies – Sends user to Travel Velocity.com login page.
- Flight Information – Sends the user to a page with multiple links all leading to Travel Velocity.com
- Reservations – All sub-links refer to Travel Velocity.com. Under the Rent a car category, why does it send the user to somewhere else compared to the Trip Planning -> Rent a car.
- Destination Guide – Links to a Travel Velocity.com page, but no login is required.
- Travel Tools – Links to a Travel Velocity.com page, which has links to everything that has already been linked to by TravTips.com – redundant.
- Vacations & Cruises – Another Travel Velocity.com login page.

- Frequent Traveler - Another Travel Velocity.com login page.

Links on the Top

Top links are somewhat redundant – either provides the same links offered on the left-hand side, or will offer the same “category” and link somewhere else. I do not see the necessity for these extra icons at the top. A few new links are offered.

Boston, MA

- Travel Guide
 1. Places to Eat – Same as left-hand side
 2. Things to do/Local Events – Different third-party website than before
 3. Places to Sleep – Same as left-hand side
- Road Trip
 1. Traffic Conditions – Same as Traffic & Maps on left-hand side
 2. Park & Ride – Provides 3 different links
 3. Driving Directions – Same as left-hand side
 4. Rent a Car – Same as left-hand side
 5. AAA – Goes to AAA website
- Rail Info
 1. Commuter Rail – List of third-party commuter rail sites
 2. Subway – List of third-party subway sites
 3. Amtrak - Link to Amtrak website
- Air Info
 1. Arrivals – Excellent page with times/flight numbers
 2. Flight Time-tables – Goes to Travel Velocity.com and requires login
 3. Reservations – Goes to Travel Velocity.com and requires login
 4. Airport Info - List of third-party airport links
- Transit
 1. Commuter Rail – Same as Rail Info -> commuter rail
 2. Subway Info – Same as Rail Info -> subway
 3. Bus – List of third-party bus sites
 4. Ferry – Locate ferries, link to third-party ferry service site.
- Home – Back to main page

Hartford, CT

- Travel Guide
 1. Places to Eat – Same as left-hand side
 2. Things to do/Local Events – Search screen. Different from before

- 3. Places to Sleep – Same as left-hand side
- Road Trip
 - 1. Traffic Conditions – Same as Traffic & Maps on left-hand side
 - 2. Park & Ride – Provides 3 different links
 - 3. Driving Directions – Same as left-hand side
 - 4. Rent a Car – Same as left-hand side
 - 5. AAA – Goes to AAA website
- Rail Info
 - 1. Commuter Rail – List of third-party commuter rail sites
 - 2. Amtrak - Link to Amtrak website
- Air Info
 - 1. Arrivals – Excellent page with times/flight numbers
 - 2. Flight Time-tables – Goes to Travel Velocity.com and requires login
 - 3. Reservations – Goes to Travel Velocity.com and requires login
 - 4. Airport Info – Leads to Bradley International Airport page
- Transit
 - 1. Commuter Rail – Same as Rail Info -> commuter rail
 - 2. Bus – List of third-party transit sites
- Home – Back to main page

New York, NY

- Travel Guide
 - 1. Places to Eat – Same as left-hand side
 - 2. Things to do/Local Events – Different third-party website than before
 - 3. Places to Sleep – Same as left-hand side
- Road Trip
 - 1. Traffic Conditions – Same as Traffic & Maps on left-hand side
 - 2. Park & Ride – Provides 3 different links
 - 3. Driving Directions – Same as left-hand side
 - 4. Rent a Car – Same as left-hand side
 - 5. AAA – Goes to AAA website
- Rail Info
 - 1. Commuter Rail – List of third-party commuter rail sites
 - 2. Subway – List of third-party subway sites
 - 3. Amtrak - Link to Amtrak website
- Air Info
 - 1. Arrivals – Excellent page with times/flight numbers

2. Flight Time-tables – Goes to Travel Velocity.com and requires login
3. Reservations – Goes to Travel Velocity.com and requires login
4. Airport Info - List of third-party airport links

- Transit

1. Commuter Rail – Same as Rail Info -> commuter rail
2. Subway Info – Same as Rail Info -> subway
3. Bus – List of third-party bus sites
4. Ferry – Locate ferries, link to third-party ferry service site.

- Home – Back to main page

Providence, RI

- Travel Guide

1. Places to Eat – Same as left-hand side
2. Things to do/Local Events – Different third-party website than before
3. Places to Sleep – Same as left-hand side

- Road Trip

1. Traffic Conditions – Same as Traffic & Maps on left-hand side
2. Park & Ride – Provides 3 different links
3. Driving Directions – Same as left-hand side
4. Rent a Car – Same as left-hand side
5. AAA – Goes to AAA website

- Rail Info

1. Commuter Rail – List of third-party commuter rail sites
2. Amtrak - Link to Amtrak website

- Air Info

1. Arrivals – Excellent page with times/flight numbers
2. Flight Time-tables – Goes to Travel Velocity.com and requires login
3. Reservations – Goes to Travel Velocity.com and requires login
4. Airport Info - List of third-party airport links

- Transit

1. Commuter Rail – Same as Rail Info -> commuter rail
2. Bus – List of third-party bus sites

- Home – Back to main page

Overall

TravTIPS is heavily reliant on www.TravelVelocity.com and simply categorizes the links and places of TV.com all on one page. Moreover, to access the features on Travel Velocity.com, the user must provide a login/password to use the free service (a free login can be obtained through TravelVelocity.com).

Some links are redundant, while others that have the same category: such as “Things to do/Local Events” will lead to two different third-party urls, depending on which link is selected.

Appendix 2: TRAVTIPS WEB SITE - REPRESENTATIVE SCREEN SHOTS

Airline Information

Bradley International Airport Home Page
Arrival Information
Flight Reservation Page

Transit Information – Massachusetts Bay Transportation Authority

Commuter and Excursion Boat Services
Subway Services

Travel Services

Vacation and Cruise Packages
Destination Guide

http://www.travtips.com/index.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Print FCI Discuss

Address http://www.travtips.com/index.html Go Links

TravTIPS
KNOW BEFORE YOU GO!

TRAVEL GUIDE ROAD TRIP RAIL INFO AIR INFO TRANSIT HOME

Hartford, CT

Arrivals Flight Time-tables Reservations Airport Info

Traffic & Maps
Your Weather
Trip Planning
On-Line Travel Agent
HERE

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Bradley International Airport
Serving Hartford/Springfield and the western New England region

[click here for news link](#)

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[Construction Update](#) | [Airlines Info](#) | [Weather](#) | [Site Map](#) | [Links](#) | [Home](#)

A Guide to Bradley
Find directions, maps, a directory of airport services and phone numbers, a list of publications you can order and general information and photos of Bradley.

Bradley News
Read the latest news announcements, press releases and helpful facts about Bradley International Airport.

Airline Information
Here's a list of Bradley's carriers, their phone number and websites, flight schedules, airline statistics or you can even track the status of an operating flight.

Construction News
See and read about Bradley's plans for a new terminal building and parking garage. Learn how construction may impact your visit to Bradley.

Parking & Ground Transportation
This section provides information on parking facilities and rates, a guide for air travelers with special needs and a directory of ground transportation services, rental car companies and off-airport valets.

Weather
Check out the current weather in the greater Hartford/Springfield region.

Internet

http://www.travtips.com/travmain.html - Microsoft Internet Explorer

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Back Forward Stop Refresh Home Search Favorites History Print FCI Discuss

Address http://www.travtips.com/travmain.html Go Links

TravTIPS
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TRAVEL GUIDE ROAD TRIP RAIL INFO AIR INFO TRANSIT HOME

Boston, MA

Arrivals Flight Time-tables Reservations Airport Info

Traffic & Maps
Your Weather
Trip Planning
On-Line Travel Agent
HERE

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Arrivals Arrivals

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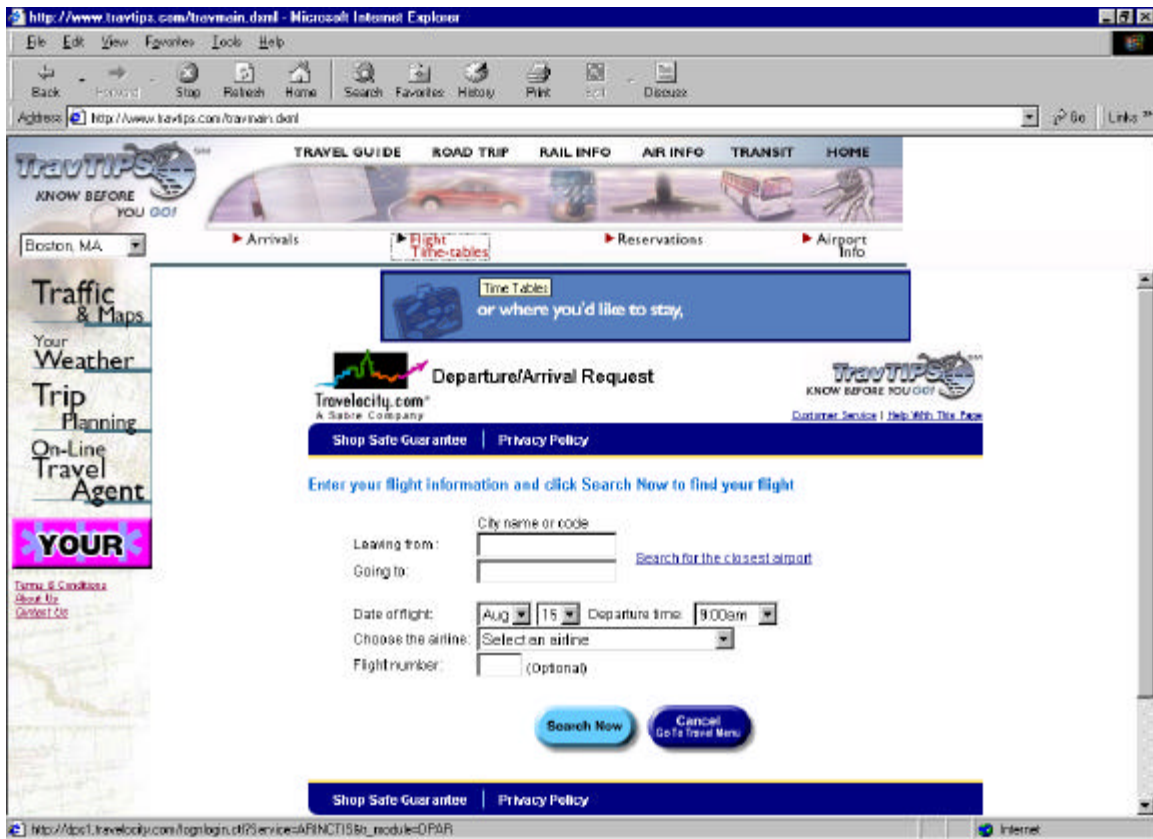
Departing	Arriving	Airline	Flight	Arrival Time	Status
ATLANTA GA	BOSTON MA	Delta Airline	1184	Aug 15, 10:51 am	In Flight
ATLANTA GA	BOSTON MA	Delta Airline	904	Aug 15, 10:55 am	In Flight
ATLANTA GA	BOSTON MA	Delta Airline	158	Aug 15, 11:33 am	In Flight
ATLANTA GA	BOSTON MA	Delta Airline	280	Aug 15, 12:38 pm	In Flight
ATLANTA GA	BOSTON MA	Delta Airline	1423	Aug 15, 01:55 pm	In Flight
CHARLOTTE	BOSTON MA	US Airways	1485	Aug 15, 11:11 am	In Flight
CHARLOTTE	BOSTON MA	US Airways	218	Aug 15, 11:41 am	In Flight
CHICAGO OHARE	BOSTON MA	American Airlines	668	Aug 15, 11:42 am	In Flight
CHICAGO OHARE	BOSTON MA	American Airlines	788	Aug 15, 11:45 am	In Flight
CHICAGO OHARE	BOSTON MA	United Airlines	582	Aug 15, 09:58 am	In Flight
CHICAGO OHARE	BOSTON MA	United Airlines	764	Aug 15, 11:42 am	In Flight

From: No Preference Find On Airline: No Preference Find

Always double check any changes in flight times, as we have no control over the airport. The TD's-9 Airport Info Service delivers data on the airport's website. The TD's-9 Airport Info Service is subject to change without notice.

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TravTIPSSM
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Boston, MA

Commuter Rail Subway Info Bus Ferry

T Massachusetts Bay Transportation Authority

MBTA Profile
Schedules & Maps
Passes & Fares
News & Information
Shop On Line

Subway
Bus
Commuter Rail
Boat
MBTA Maps

Commuter and Excursion Boat Services

Click on map location to enlarge

Internet

http://www.mbta.com/schedmaps/boat/index.cfm

http://www.travtips.com/index.html - Microsoft Internet Explorer

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Address http://www.travtips.com/index.html

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TRAVEL GUIDE ROAD TRIP RAIL INFO AIR INFO TRANSIT HOME

Boston, MA

Commuter Rail Subway Info Bus Ferry

T Massachusetts Bay Transportation Authority

MBTA Profile
Schedules & Maps
Passes & Fares
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Subway
Bus
Commuter Rail
Boat
MBTA Maps

Subway Service

[Schedules](#) | [PDF Formatted Schedule](#) | [Fares](#)

Please click on a subway line for more information about that line or any of the stops on it.

Internet

http://www.mbta.com/schedmaps/subway/index.cfm

http://www.travtips.com/index.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Print Exit Discard

Address http://www.travtips.com/index.html

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TRAVEL GUIDE ROAD TRIP RAIL INFO AIR INFO TRANSIT HOME

Hartford, CT Travel Agencies Flight Information Reservations Destination Guide Travel Tools Vacations & Cruises Frequent Traveler

Traffic & Maps

Your Weather Trip Planning On-Line Travel Agent

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Tools

Review Your Vacation Plans

Review your pending vacation itineraries or make a payment on an existing reservation.

Traveler Reviews

Read or submit hotel and cruise reviews and reviews of hotels and cruises.

Message Boards

Exchange travel information.

Vacations & Cruises: search & compare

Search Type: Any Package Destination: Any Destination

Maximum Price per person: Any Price Month of Travel: Any Month

Go!

Shop by Location

FEATURED DESTINATIONS

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CHOOSE A REGION

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featured deals

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Incredible Caribbean Cruises from \$399

(2 items remaining) Downloading picture http://assets.trovecity.com/images/Vacations/Hotels/seekdeals_home_outletimage.jpg...

Internet

http://www.travtips.com/index.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Print Exit Discard

Address http://www.travtips.com/index.html

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